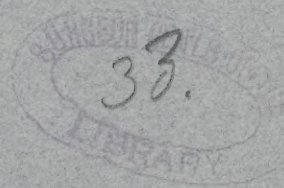
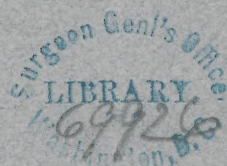


BIXBY (GEO. H.)

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IN THE TREATMENT OF SUPPURATING  
CAVITIES AND PELVIC DRAINAGE.

BY GEO. H. BIXBY, M. D.,  
OF BOSTON.

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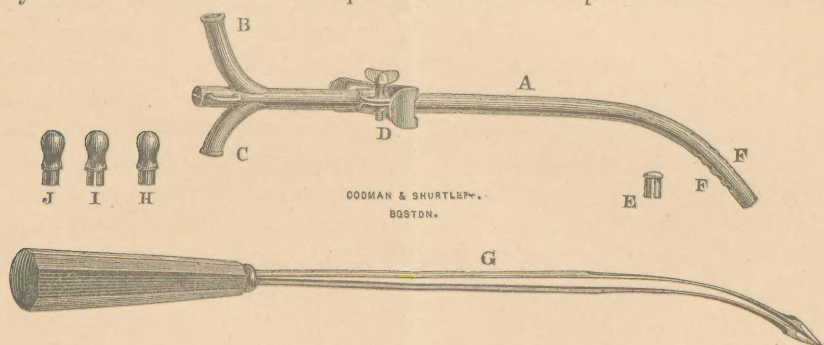
## A NEW INSTRUMENT FOR THE READY AND EFFECTIVE USE OF THE DOUBLE CURRENT IN THE TREATMENT OF SUPPURATING CAVITIES AND IN PELVIC DRAINAGE.

BY GEORGE H. BIXBY, M. D., OF BOSTON,  
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IN the course of a somewhat extended experience in the treatment of the surgical diseases of women, an unusually large number of cases of pelvic abscesses, retro-uterine hæmatocele, and intra-uterine tumors have come under my observation. In a review of the clinical history of the two first-mentioned affections and of the means employed in their treatment, I find that while in a few instances a single evacuation by aspiration or otherwise was sufficient to obliterate the suppurating cavity, the majority of cases required the use of stimulating and disinfectant injections. The employment of the different forms of double catheters and drainage tubes hitherto in use was most unsatisfactory, in my hands at least, the treatment being in some cases unsuccessful and in others unnecessarily prolonged. Among the difficulties encountered I will mention, first, the liability to displacement, and, owing to the lax condition and the change in the relations of the tissues, the extreme difficulty attending reposition, attempts to restore the instrument not unfrequently proving unsuccessful, even after prolonged and tedious manipulations, thus necessitating the establishment of a new opening; second, the tax upon the strength of the patient and the demand upon the time and patience of the surgeon. I recall the histories of several cases in which, from a tardy recognition of the disease, surgical interference was delayed, and the poisonous effects of the discharge were so marked that the interruption of the treatment, even for a few hours, was followed by grave symptoms of septic poisoning; and notwithstanding the imperfect appliances at my disposal, upon vigorous resumption of the treatment an amelioration of the symptoms took place immediately. It is evident from these facts that the displacement of any appliance for maintaining a patent aperture, the subsequent closure of the aperture, and the interruption of the treatment, even for a short time, become under all circumstances serious affairs. In view of these difficulties, and encouraged by the recent discussions and by the acceptance on the part of the profession of the theory that blood-poisoning is the most frequent cause of death after abdominal and pelvic operations, as well as a



possible cause of the so-called puerperal fever, I have been led to the suggestion of a new instrument for the application of an old but most useful surgical principle in the treatment of such affections. The instrument, which I shall denominate the *double trocar*, consists of a canula ten inches long and one fourth of an inch or less in diameter, straight or curved according to its particular use. A horizontal septum divides its cavity into two equal chambers, the inferior extremity of each being fenestrated to the extent of an inch. Superiorly each chamber is connected by a branch, the afferent and the efferent, with rings and guard for retention. Into this double canula there fits a flexible double trocar attached to a common handle, and answering for both the curved and the straight canula. When the trocar is inserted and forced home, the two extremities come together in sufficiently close apposition to form a single point. A piece of rubber tubing two or three inches in length attached to the afferent branch forms a convenient coupling for the nozzle of the syringe, and the efferent is lengthened to the desired extent by the same means. The copious and uninterrupted current and the



A. Canula.  
B. Efferent branch.  
C. Afferent branch.  
D. Guard.  
E. Probe point.

F F. Fenestræ.  
G. Double trocar.  
H J. Efferent and afferent stoppers.  
I. Central stopper.

absolute immunity from the admission of air, obtained by the use of the fountain syringe, render that instrument, or an apparatus constructed upon the same principle, absolutely indispensable to the use of the double canula.

It is claimed for the double trocar that, while it has all the advantages of the single instrument, it possesses the additional advantage of establishing at the same time a complete appliance for the double current. It is claimed also, that from the copiousness of the current obtained by means of this instrument it has all the advantages of a large opening, without the dangers of hæmorrhage, and with less risk of self-inoculation.

This instrument is recommended in the following conditions:—

With straight trocar and canula :

I. Pelvic abscess.

II. Retro-uterine hæmatocele.

With straight canula alone and blunt point :

III. Pelvic abscess and hæmatocele, when a free opening is preferred and when there is a multiple sac.

With the curved instrument :

IV. Pelvic drainage after ovariectomy and abdominal operations.

With straight canula alone :

V. The uterine cavity after the removal of intra-uterine and interstitial uterine fibroids.

VI. The uterine cavity in acute puerperal endometritis, offensive post-partum vaginal discharges, for the application of cold and of astringents in post-partum hæmorrhage, and for the treatment of the female bladder.

I. *Pelvic Abscess.* — At the opening of this paper I stated that with rare exceptions a single evacuation, by whatever means, was not sufficient to destroy the pyogenic membrane of a pelvic abscess ; therefore the existence of pus in the pelvic cavity was an indication for the immediate commencement of the protracted treatment.

Pelvic abscesses are most often unilocular ; cases with multiple sacs, however, do occur. In case of doubt as to whether we have to do with a unilocular or a multiple abscess, by evacuating completely with the aspirator the subsequent presence or absence of fluctuation is easily determined by a careful examination.

The method of operating now considered, being a substitute for the free opening, does not differ materially from that laid down in the text-books ; but at the risk of being prolix I shall describe it in detail, with some modifications. The patient, etherized and with a bandage passed around the waist, is placed upon the left side across a bed or upon a table ; the right limb sharply flexed, or, if preferred, in the lithotomy position. The uterus, if not anteverted, which is more often the case, should be so placed, if it be possible ; if necessary it should be held in that position with a sound.<sup>1</sup> The diagnosis is then confirmed with an aspirator, the depth required to reach the fluid being carefully noted.

Since a complete or even a partial evacuation in a unilocular cyst would cause it to become flaccid, and would render further operative interference exceedingly difficult if not dangerous, the least possible amount of fluid drawn the better. The most prominent part of the tumor having been ascertained, and the seat of the pulsation of large vessels avoided, the trocar, with concealed point and armed with the guard and with both rubber tubes in place (the afferent closed with a stopper, the

<sup>1</sup> During the past year I saw a case of pelvic abscess in which the uterus was retroverted and bound down by adhesions. I have no doubt that the inflammation and subsequent suppuration were due to efforts employed to separate them.



efferent tied in a single knot), is introduced into the vagina upon the finger of the left hand and placed firmly against the tumor. With the left hand in the vagina, controlling the extremity of the trocar, the puncture is made in downward direction with a firm but steady force. The peculiar impression imparted as the instrument passes into the cavity is quite unmistakable. The previous arrangement of the tubes prevents a sudden escape of the fluid. The trocar is now withdrawn sufficiently to conceal its point, the guard secured against the vulva, and the tapes for retention applied. The last step is best effected by passing them through the staple, around the limb, under the bandage around the waist, and finally tying or, what is better, buckling the extremities together in front. The patient being on the left side, the right tape of course is first applied, and will serve to retain the instrument until she is turned upon the back, when the other is adjusted. If the operation is performed with the patient on her back, of course both tapes are put in position at once. The patient is now placed upon the back, near the edge of the bed, and the left tape adjusted. We may evacuate the abscess at once, but the better plan is to attach to the afferent branch the tube of a fountain syringe charged with a disinfecting solution, and suspended or held six feet above the bed, at the same time untying the knot in the efferent branch and placing its extremity in a vessel on the floor beside the bed. The trocar is now withdrawn without fear of displacement, the central opening of the canula is closed with a stopper, the stop of the syringe is opened, and the contents of the abscess are forced out by the strong current.

We have now in position a convenient and ever ready appliance for the use of the double current, with little risk of displacement, of easy application by the most inexperienced attendant, and with slight annoyance to the patient. The frequency of the application should depend upon the nature of the discharge and its effect upon the system. I have usually commenced the treatment with three daily applications and one at midnight. Under all circumstances the application should be copious. The efferent current should be frequently interrupted, the cavity thus filled, and contact with every part of it secured. After a fair trial of the usual disinfectants I have returned to the use of a five per cent. solution of carbolic acid (four drachms to sixteen ounces of glycerine, soap, and water) as by far the most efficacious.

II. *Retro-Uterine Hæmatocele.* — Since the investigations of M. Nélaton the surgical treatment of this affection has been confined to those urgent cases in which the life of the patient was imperiled from a distention that threatened rupture into the peritoneal cavity. The cases under my observation were of this character. In all, the treatment was by a primary free opening, followed by disinfecting injections. The discharge, at first sero-sanguinolent, became putrid, de-

manding protracted and unremitting attention. Owing to the great tendency to close in spite of repeated dilatations, the method of treatment was reduced virtually to an opening of the size made by a large trocar. The patients recovered, but not until many weeks had elapsed, the most alarming symptoms of blood-poisoning frequently occurring. Notwithstanding the recommendation by most authorities of a free opening in the treatment of this affection, I am disposed to attach much importance to the method above suggested in connection with the treatment of pelvic abscess, for the reason that, as the aspirator indicated in all my cases, the contents of the cyst are composed, even in the late stages, not only of coagula but of a large amount of sero-sanguinolent fluid. After what seemed to be a complete evacuation after the free opening, the cavity continued to secrete for weeks a purulent, offensive discharge, as if from a pyogenic membrane. I am convinced that the entrance of air through such an opening was sufficient to break down and liquefy the coagula. That this process was materially expedited by the copious double current there can be no doubt.

III. *In Pelvic Abscess and Hæmatocoele*, after free opening, the use of the straight canula with probe-point in connection with the fountain syringe, in the manner to be described when the treatment of the uterine cavity is discussed, will be found to render invaluable service.

IV. *Pelvic Drainage after Ovariectomy*.—When the operation has reached the stage prior to that of the closure of the wound, after applying a bandage around the body, the surgeon passes the left hand into the pelvis along the pedicle until it reaches a point in the reflexion of the peritoneum opposite Douglas's fossa, and with the right hand introduces the trocar into the vagina, armed with its guard, its afferent and efferent tubes adjusted, and its point concealed. With bimanual manipulation the extremity of the instrument is placed against Douglas's cul-de-sac, as low as possible below the uterine connection, without impinging upon the rectum, and held firmly in position. An assistant pushes the trocar through the vaginal septum, its passage being guarded and controlled by the operator's left hand, still in the pelvis. This done, the point of the trocar is concealed by a slight withdrawal, the instrument tilted upward and forward, and the extremity of the canula protected by a probe-point.<sup>1</sup> The guard and tapes are adjusted as in pelvic abscess, and the trocar is entirely removed.<sup>2</sup> Of the use of the double current in pelvic drainage, special mention will be made later.

For the conception of the idea of drainage in the after-treatment of ovariectomy, and its first application, the profession is indebted to the

<sup>1</sup> After introduction, Dr. Kimball reverses the curved canula.

<sup>2</sup> The straight canula with probe point introduced through the wound into the pelvis at the time of the operation, and reposed in the angle of the wound, would, it seems to me, admirably carry out Professor Peaslee's method of drainage, having also the additional advantage of the double current.



genius of Prof. E. R. Peaslee of New York, who first employed it through Douglas's fossa. For the further development and perfection of this method, the credit belongs to Dr. Gilman Kimball of Lowell. This, I think, is fully substantiated by the following brief history. In 1846, Dr. Handyside, of Edinburgh, after tying the pedicle, passed the ligatures through Douglas's fossa into the vagina. In 1849, Dr. March, of Albany, *suggested* the idea. Professor Peaslee, not aware of this, did the same in 1854. The object of this procedure, as in the above cases, was simply to dispose of the ligatures. *In 1855, in a case of ascites complicated with an ovarian cyst, Professor Peaslee passed an elastic catheter from the vagina up into Douglas's cul-de-sac, expressly for purpose of drainage.* The method of passing the ligatures through the cul-de-sac of Douglas, as inaugurated by Dr. Handyside, was employed again in 1866 by Dr. J. F. Miner, of Buffalo, by Dr. Gilman Kimball in 1867, and still later (I believe in 1871) by Dr. William Warren Greene, of Portland. The object of the operation in the three last cases was *to establish drainage.* In 1868, Dr. Kimball modified the operation by lodging the ligatures in a canula introduced *per vaginam* into Douglas's cul-de-sac. More recently he again modified it, bringing the ligature outside of the wound (except when the clamp was used) passing the canula into Douglas's fossa and allowing it to remain as long as it served to conduct off any matter that had accumulated in the pelvic cavity. Pelvic drainage has been frequently employed since, and the subject has been discussed by able authorities at home and abroad.<sup>1</sup> A complete history of this important subject would far exceed the scope of this paper. I cannot, however, resist the opportunity to vary somewhat its descriptive character, by submitting without comment the condensed histories of a few cases from the literature of the subject (confining myself to three authorities), as illustrative of the primary and secondary indications and applications, and of the results of pelvic drainage after ovariectomy.

The following is the *first case on record of primary drainage* through Douglas's cul-de-sac, by Prof. E. R. Peaslee, of New York.<sup>2</sup> "This was a case of ovarian tumor complicated with ascites, one hundred and six pounds of fluid withdrawn by a previous tapping. In anticipation of continued secretion from the distended peritoneum, after operation a gum-

<sup>1</sup> Prof. E. R. Peaslee: *Diseases of the Ovaries*, pages 437, 438; *American Journal of Obstetrics*, August, 1870, pages 509, 510; *American Journal of the Medical Sciences*, January, 1856. Dr. Gilman Kimball: *Boston Medical and Surgical Journal*, May 28, June 11, August 6, 13, September 17, 1874. Mr. Spencer Wells: *Diseases of the Ovaries*, 1865, page 393, 1873. Dr. Skene, Brooklyn: *New York Medical Record*, October 1, 1873. Dr. J. Marion Sims: *New York Medical Journal*, December, 1872, April, 1873. Dr. W. W. Greene, Boston *Medical and Surgical Journal*, lxxxiv. 137. Mr. Thomas Keith: *Transactions of the London Obstetrical Society*, v. 62; also his cases Nos. 36, 39, 59, 81, 101, and 103. Dr. J. F. Miner: *Buffalo Medical and Surgical Journal*, June, 1866, September, 1866.

<sup>2</sup> *Ovarian Tumors*, pages 510-518. *American Journal of Obstetrics*, August, 1870.



elastic catheter was passed by the vagina through Douglas's cul-de-sac into the peritoneal cavity, and tightly corked. Patient did well until fifth day, when symptoms of septicæmia appeared, and on removing the cork a small amount of fœtid fluid escaped. Injected a quart of luke-warm water through the tube into peritoneal cavity, and allowed as much to flow back. On repeating this, the patient remarked, 'I feel as refreshed as if I had taken a bath,' and became bright and natural. Septicæmic symptoms would, however, return in eight or twelve hours. Injections of artificial serum composed of one or two drachms of common salt to the pint of pure water; later, solution of the liquor sodæ chlorinatæ, from one to two drachms to the pint of water, alternately with the salt and water, was employed two or three times daily for seven days, when, there being no longer any odor of decomposition in the fluid obtained through the tube, the latter was removed." Result, recovery.<sup>1</sup>

The following are abstracts of Dr. Kimball's cases from 1867 to 1875, giving the indications for application and results of primary drainage; these include the first cases in which the ligature was lodged in a canula and also the first cases in which the canula was used alone.

CASE I. Single ovary. Complications: chronic adhesions, anteriorly, parietal, omental, and colon; laceration of peritoneum; escape of contents into peritoneal cavity. Pedicle: short and thick; tied in two parts; cut close; dropped into pelvis. Method of drainage: ligatures passed through posterior uterine cul-de-sac and out by the vagina. Symptoms: excessive vomiting, relieved upon escape of putrid discharge from vagina; no further interruption to convalescence. Result, recovery.

CASE II. Single ovary. Complications: ascitic fluid, chronic adhesions, parietal and omental. Pedicle: slender, ligated. Drainage: ligature passed through Douglas's fossa. Symptoms: third day, pain in abdomen; vomiting; quickened pulse; prostration. The same day free offensive discharge per vaginam. Result, recovery.

CASE III. Single ovary. Complications: ascitic fluid; adhesions anteriorly, parietal and omental. Separation followed by free hæmorrhage, ligature required; several shreds of peritoneum and omentum ligated and removed. Pedicle: short, slender, ligated. Drainage: ligatures passed out through vaginal cul-de-sac. Symptoms: favorable till eleventh day, when signs of tetanus appeared; abundant flow of bloody serum immediately after operation, and continued to a greater or less extent throughout; was offensive and fœtid on the second day. The fact that there were no signs of septicæmia proved the value and success of the drainage, and without the accidental com-

<sup>1</sup> Professor Peaslee has used drainage in every case of ovariectomy since 1855, in which there was anything to drain from the peritoneal cavity after that operation; but he has always, since then, preferred to drain through the abdominal wound, and not by the cul-de-sac.

plication, recovery would have very likely resulted. Result, death from tetanus, twentieth day.

CASE IV. Single ovary. No pedicle; tumor attached and identified with entire broad ligament, and portion of the fundus uteri; breadth of mass, six inches; division into six parts, each embraced in a separate ligature, uterus cut through, its centre having been transfixed by strong ligatures and tied separately. Drainage: passage of the latter ligatures through canula in vaginal cul-de-sac. Symptoms: indications of peritonitis after twenty-four hours, namely, vomiting, tympany, continuing three days, when a free flow of bloody serum began from the canula. Immediate cessation of above symptoms. Later, discharge offensive, nature improved by the use of disinfecting injections through the canula. Canula removed after eight days; discharge continued, but gradually diminished and ceased at the end of ten days. Result, recovery.

CASE V. Single ovary. Complications: tapping previous to operation; ascitic fluid; rupture of the cyst; prolonged operation; adhesions parietal and omental, portions of omentum removed. Pedicle: tied in two parts, dropped back. Drainage: ligatures passed through Douglas's fossa through a canula. Symptoms: first day, pulse 130-140, abdomen somewhat distended, slight pain. Third day, pulse 130, no pain, no tympany; P. M., pulse 140, dark discharge from vagina, the first since operation. Fourth day, morning, pulse 132, no vaginal discharge; six A. M., vaginal discharge returned; twelve M., discharge continued; two P. M., tired and nervous, slight discharge from the vagina, bowels distended, clammy sweat, cold feet. Fifth day, A. M., discharge from wound slight, distention continued, return of heat to extremities; P. M., two ounces of foetid discharge from vagina. Eighth day, discharge more abundant, pulse 130. Tenth day, ten ounces sero-purulent, dark-colored, offensive fluid from peritoneal cavity, symptoms more alarming. Twelfth day, pulse 110, offensive discharge continued from abdomen and vagina, incision not inclined to heal soundly. Fifteenth day, pulse 100, discharge from abdomen diminished and less offensive, vaginal discharge continued. Result, recovery, after protracted convalescence.

CASE VI. Single ovary. Complications: tapping previous to operation; adhesions parietal and omental; profuse hæmorrhage from the same; portions of omentum cut away and stump reposed in incision; escape of fluid into cavity. Pedicle: tied in two parts; dropped. Drainage: ligature passed by a canula through Douglas's fossa. Symptoms: two days after operation, discharge of bloody serum; ceased on the third and did not return; symptoms favorable up to fourth day; then became alarming, such as pain, distention, nausea, vomiting, and quickened pulse. In absence of surgeon, nurse passed a female cath-



ter into left iliac fossa and removed ten ounces of foetid fluid ; immediate relief. Result, rapid disappearance of threatening symptoms, speedy recovery.

CASE VII. Both ovaries. Complications : burst cyst ; escape of contents into peritoneal cavity ; adhesions general and to viscera. Pedicles : both slender, short ; cut close to tumor ; dropped back. Drainage : ligatures twisted together, passed through Douglas's fossa, through a canula. Symptoms : first day, *A. M.*, slight pain in abdomen ; vomiting occasionally as before operation. Second day, nausea ; pulse 110 ; no discharge through canula. Third day, slight discharge. Sixth day, pulse 112 ; vomiting continues ; slight distention ; discharge from vagina abundant and offensive. Later, escape of discharge through incision, that from vagina in no way diminished ; antiseptic injections through canula and into abdominal cavity produced no favorable effect upon the quantity or quality of the discharge ; continues unabated. Result, death from septicæmia, twelfth day.

CASE VIII. Single ovary. Complications : ascitic fluid ; none escaped into cavity. Pedicle : broad, thick ; clamp. Drainage : angle of wound, and ligature passed through vaginal cul-de-sac through canula. Symptoms : first day after operation, bloody serum passing freely from canula. Fourth day, pain in the bladder ; discharge from canula ceased. Sixth day, free discharge of offensive matter forced through the incision ; injection through angle of the wound every few hours. Symptoms favorable. Convalescence interrupted by an attack of diarrhœa, lasting four days. Result, recovery.

The following are notes of other cases of Dr. Kimball, that came more or less under my observation : —

CASE I. Large cyst. One ovary. Complications : adhesions, parietal, omental ; profuse hæmorrhage ; walls everted. Pedicle : ligated, drawn up and reposed in the angle of the wound. Drainage : single curved trocar ; cul-de-sac. Symptoms : escape of bloody serum twelve hours after operation. Third day, passage of rectal injection through canula, and later, fecal matter. Canula removed. Pain, distention, restlessness, evidence of impaction of feces, relieved by oil and afterward copious soap and water enema. Result, subsequently rapid recovery.

CASE II. Both ovaries, in a patient aged seventy. Complications : enormous distention ; fifty inches ; extensive adhesions to parietes, omentum, intestines, pelvis. Operation protracted ; large portions of peritoneum and omentum ligated and removed ; escape of fluid into cavity ; tumor and contents weighed one hundred and fifty pounds. Pedicle : clamp and ligature ; the last reposed in angle of wound. Drainage : canula through Douglas's fossa. Symptoms : bloody serum first two days ; displacement of canula fourth day. No further

discharge, no untoward symptoms. Result, slow but complete recovery.

CASE III. One ovary. Complications: œdema of extremities; great distention intensified by respiration; infiltration of walls of abdomen; burst cyst. After closure of the wound ascitic fluid welled up through angle of wound. Drainage: canula, cul-de-sac. Symptoms: abundant flow of serum for several days. No serious symptoms. Result, recovery rather slow but complete.

Mr. Spencer Wells's cases, showing secondary indication for drainage, are as follows:—

CASE I. Single ovary. Complications: tumor in connection; extensive adhesions to omentum and bladder. Pedicle: ligated and returned. Symptoms: third day, sharp pain, relieved after uterine discharge, resembling menstruation; continued well until ninth day. Later, sleepless night from pain and flatulence; typhus symptoms; dry tongue, dilated pupils, flushed face, drowsiness. An accumulation of fluid detected in pelvis per vaginam. Puncture with trocar, five ounces dark, bloody serum, ammoniacal odor, removed. Tenth day, pulse 112, 95, 92. Typhus condition aggravated, as discharge from vagina had ceased; examination revealed fluid still present in vaginal space. Puncture again resulted in removal of ten ounces of fluid; more putrid than that of the day before, and containing pus. Chassaignac's drainage tube passed through the two punctures forming a loop. Free discharge through tube for several days; rapid improvement. Tube removed twenty-eighth day; thirty-fourth day sat up; forty-second day left for home; one month later was in perfect health.

CASE II. Single ovary; no adhesions. Pedicle: clamped. Symptoms: second day, flatulent distention of abdomen; removal of clamp necessary; pulse 130. Fifth day, free discharge of dark, bloody serum from wound. Sixth day, discharge free, pulse 116. On ninth day, also on tenth and eleventh, discharge still foetid, but more purulent. Twelfth day, patient very low; a soft swelling found behind the uterus. This was punctured through the cul-de-sac, giving escape to a pint of serum with blood and some pus. Thirteenth day, free suppuration from wound; P. M., a free discharge of foetid pus by the vagina. She gradually sank, and died on the twenty-sixth day.

*Post-Mortem.* No signs of general peritonitis; bottom of Douglas's fossa and cavity holding three or four ounces of pus. The opening through Douglas's fossa made with trocar was quite closed. *It is to be regretted that a freer opening was not made and left open.*

CASE III. One ovary. Complications: adhesions, parietal, pelvic. Pedicle: ligated. Symptoms: forty-seven hours after operation stitches removed, wound seemed firmly united; nine P. M., attack of vomiting, escape of reddish serum from angle of wound. Fifth day,



pulse 140, abdomen tympanitic, evidently containing fluid. Evidence of fluid high up behind the uterus. Vomiting with prostration continued, and on sixth day pulse 160; a half-ounce of reddish grumous fluid from open angle of the wound. At midnight wound commenced discharging, and then the symptoms became more favorable. Seventh day, evidence of fecal impaction; relieved; pulse fell at once from 160 to 130; discharge of curdy fluid. Eighth day, free discharge from the wound. Evidence of fluid behind the uterus still existing; a trocar passed into Douglas's fossa gave vent to three and a half pints of black, fetid, tarry fluid. Sixteenth day, trocar again introduced, and one pint of fluid discharged. Seventeenth day, canula replaced and more fluid escaped and continued to do so all night. On twenty-first day, discharge free, fetid, yellow, and purulent; pulse 140. Twenty-fifth day, discharge continues; canula withdrawn; the flow ceased the next day. By probing the cavity one ounce of fluid removed. Result, death on twenty-ninth day.

*Post-Mortem.* Recto-vaginal pouch empty; utero-vesical pouch filled with creamy pus; pus found incarcerated between the coils of intestines, forming a large number of abscesses.

We come now to the consideration of the use of the double current in connection with drainage. As we have seen, the cessation of the discharge, which was invariably followed by alarming symptoms, was due to the obstruction of the canula. This was constantly proved, from the fact of its return after free injection. Upon examination of the canula that had been obstructed shortly after the operation, I found the closure to be due to hardened coagula, that required considerable force to detach. When the obstruction took place some days later, it was evidently caused by an accumulation of thick, tenacious, sero-purulent or ichorous matter, exceedingly difficult to dissolve and wash away with a single current.

From a careful study of the foregoing cases, we venture to offer the following suggestions. The canula in position as above described, as in pelvic abscess, the hose is attached to the afferent branch and the efferent tube is placed in a vessel beside the bed. The first few hours a sero-sanguinolent discharge usually flows of its own accord, but this being the usual stage for the formation of coagula, at least as soon as six hours after the operation a current of tepid water, slightly carbolized, should be allowed to make the circuit of the instrument, merely for the sake of insuring patency. If at the end of four or five days the fluid escapes in the same condition as when it entered, and there are no untoward symptoms present, in all probability the necessity for drainage has ceased, and the canula may be removed with impunity. Leaving the instrument in position a longer or shorter period, even after this stage its presence being, in my opinion, indifferent, must depend upon the

judgment of the surgeon. If, on the other hand, early after the operation, or even a few days later, we discover local or general signs of putrid accumulation, the injection should be copious, frequent, and highly disinfectant, and the case treated precisely as one of abscess in any other part. I see no reason why, by cutting off the efferent current the entire abdominal cavity may not be thoroughly washed out.

*V. Treatment of the Uterine Cavity after the Removal of Intra-Uterine and Interstitial Fibroids.* — If there be great danger from blood-poisoning, when the exciting cause is situated in the cellular tissue, how much greater must be the tendency when the nidus of infection is located in the cavity of an organ so rich in vessels and nerves as the uterus. The uterus in patients enfeebled by years of constant metrorrhagia tolerates most astonishingly the violent and protracted manipulation often necessary in the enucleation of intra-mural fibroids, but death results in a comparatively short time from the confinement within its walls or cavity of the smallest quantity of putrid matter. The cases are by no means rare in which death has taken place from septicaemia, incident to a degenerating fibroid, and for want of a perfect drainage for the removal of purulent and putrid matter, following the removal of such growth by operation.

For the prevention of such unfortunate occurrences, from personal experience the use of this instrument is most earnestly recommended. The method of its application is as follows: The patient being on the edge of the left side of the bed, the surgeon seats himself a little below the pelvis. A No. 4 fountain syringe, previously charged with a disinfecting fluid, is suspended or held six feet above the bed. The hose is coupled with the afferent branch of the canula. The canula is now introduced into the patulous os, and held in position with the left hand; this done, the nurse arranges the bed-pan and places the afferent tube (four inches long) of the canula in it. The suction extremity of a Davidson's syringe is placed in the bed-pan, the other in a vessel at the surgeon's feet. Everything being in readiness, the stop of the hose is opened. As the fluid begins to enter the pan, having made the circuit of the canula and the uterine cavity, the surgeon simultaneously commences with the Davidson's syringe to pump the fluid into the vessel at his feet. In this manner any amount of the fluid can be employed without once overflowing the pan and wetting the patient, an accident most annoying, not to say dangerous, since it necessitates an immediate change of clothing. As in pelvic abscess, during the passage of the fluid the current should be frequently interrupted, in order to secure its contact with every part of the suppurating surface. In a large and patulous uterus no danger need for a moment be feared. In my cases this procedure occasioned a sense of fullness, but not the slightest pain or discomfort. This treatment was employed in one of



my cases (twice daily by myself, and at midnight an injection through the drainage tube by the nurse) for eighteen days, the occurrence of menstruation being no contraindication. The quantity used was always profuse, not less than two and three quarts. Again I have to say that I relied mainly upon the employment of a solution of carbolic acid, four drachms to sixteen ounces of glycerine, soap, and water. Though the tumor enucleated was six inches in diameter, its removal leaving an enormous suppurating surface, from one end of the treatment to the other there was not the slightest evidence of septic poisoning, and the patient made a rapid recovery.

VI. *The Treatment of the Uterine Cavity in Acute Puerperal Endometritis and in Offensive Post-Partum Vaginal Discharges.*—For a clear and comprehensive view of the relations of puerperal fever to the infective diseases and pyæmia, I would in this connection call attention to the recent exhaustive discussions upon the subject at the instance of Mr. T. Spencer Wells, by the Obstetrical Society of London.<sup>1</sup> The editor of the *Obstetrical Journal of Great Britain* thus closes a short review of this memorable scientific contest:<sup>2</sup> “Now the profession may know what are the latest and most mature thoughts of the best obstetrical authorities in England,<sup>3</sup> upon a disease in which few indeed are not gravely interested. Every particle of evidence relating to it has been resifted and retested. The very term *puerperal fever* has had a struggle for its existence, and although the time does not seem to have arrived for its abolition, its right to exist is strongly denied by several. On many points there still remains much obscurity and difference of opinion. On others, again, there is a happy unanimity. All agree that the puerperal condition of a woman is one which renders her liable to be affected by influences which at another time might produce no serious mischief. A large majority of the Fellows believe that puerperal fever is caused by septicæmia, autogenetic or communicated. The very soul and strength of the discussion rests in this thought. Here is the idea which cannot be too vividly impressed upon the minds of all obstetricians and midwives. Upon its entire acceptance and proper apprehension depends the safety of the mother. An offensive post-partum vaginal discharge must not be permitted. It must be prevented by skillful management of the third stage of labor, by insuring efficient lochial drainage, and, if necessary, *by washing out the utero-vaginal canal with antiseptic fluid*. No one now doubts the communicability of the poison which exists in putrid lochia, or that the most minute quantity of it conveyed to a healthy puerperal woman

<sup>1</sup> *Obstetrical Journal of Great Britain*, May, June, July, August, 1875.

<sup>2</sup> *Idem*, September, 1874, pages 392, 393.

<sup>3</sup> The editor should have said also “America,” since Prof. Fordyce Barker, of New York, took an active part in the discussion.

may produce in her a fatal complaint. A responsibility of a most serious nature attaches itself to all those who have in any capacity to deal with lying-in cases. A mystery hangs over the nature of this pyrogenic fluid, but the laws which relate to its origin and propagation are sufficiently well known to enable us to do much toward checking its generation and preventing the extension of its malignant action when begotten."

Notwithstanding their able opponents, so far as my experience goes I am disposed to place myself with the majority of the Fellows in regarding septicæmia, autogenetic or communicated, as the cause of so-called puerperal fever; hence it has been my habit for years to employ disinfecting vaginal injections after every case of labor.

Again, as a further evidence of a growing interest in the subject, Dr. Grünewald, of St. Petersburg, details the measures which were adopted at the lying-in asylum in that city to prevent infection.<sup>1</sup> "Acting on the theory that some wound or laceration of the parts concerned in labor presented a nidus for the reception of the disease, attention has been directed toward these points, and the result has been happy. The most common starting-point was held to be the vagina or the os uteri. At these points the poison was absorbed, and the disease traveled onward along the planes of connective tissue. The rule observed was to examine every woman by the aid of a speculum immediately after labor. Every laceration or abrasion was then carefully attended to, and as soon as a morbid appearance, such as diphtheritic deposit or the like was noticed, a solution of carbolic acid and water (one part to twelve) was applied, or the sesquichloride of iron in a similar proportion. If the disease advanced and there were signs of endometritis, injections were practiced by means of a double catheter. The indications for intra-uterine injections were (1) retention of membranes, (2) retention and decomposition of coagulated blood, (3) lochiometra, (4) in any form of endometritis, and (5) in secondary hæmorrhage. In fact, it was customary to use a weak solution of carbolic acid (one part to four hundred) as an intra-uterine injection, in all cases, immediately after labor, by way of prophylaxis.

The necessity for the most thorough application of disinfecting measures at the slightest evidence of an offensive post-partum vaginal discharge being placed beyond question, the double canula and fountain syringe will be found an invaluable means for the accomplishment of this end. The method of application is the same as that employed in treatment of the uterine cavity after removal of fibroids.

VII. The method of application in the use of cold and astringents in *post-partum hæmorrhage*, being the same, does not require a separate mention.

VIII. In the treatment of *chronic cystitis in the female*, the canula

<sup>1</sup> American Practitioner, October, 1875, page 337.



is employed, with long efferent tube, as in pelvic abscess after simple puncture.<sup>1</sup>

Originality is here claimed for the double trocar only ; for the double canula is mainly an improvement upon those hitherto in use. The compactness of the instruments, available for so many different and important ends, renders it useful as well to the general as to the special practitioner. The double trocar is manufactured by Messrs. Codman and Shurtleff, of Boston, for whose patience and painstaking I desire to express my sincere obligations.

<sup>1</sup> The curved canula with probe point admirably answers the purpose of a double male catheter.









